

**REMARKS**

Favorable reconsideration of the above-identified application is requested in view of the following remarks.

Claims 1, 2, 4, 5, 9, 10, 12, 13, 17, 18-25, 27, 30-33, 36 and 38 are canceled. Claims 6, 7, 11, 14-16, 28, 29, 35, 37, 40 and 41 are withdrawn from consideration.

Claims 3, 6-8, 11, 14-16, 26, 28, 29, 34, 35, 37 and 39-41 are pending in this application, with Claims 3, 8, 26, 34 and 39 being at issue. Claim 39 is the only independent claim at issue.

Claim 39 is rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,270,199, hereinafter *Kimura*. Claims 3, 8, 26, 34 and 39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,325,492, hereinafter *Koitabashi*, in view of *Kimura*.

*Koitabashi* discloses an ink jet recording apparatus that is capable of varying the ejection amount of image forming droplets during successive ejections in multi-value printing modes, but does not disclose smoothing by ejecting both image forming droplets and smoothing droplets from the same nozzle. In column 25, lines 51-55 (emphasis added) *Koitabashi* states that "upon performing smoothing, it is desirable to make the dots to be formed in the smoothing mode by reducing the ejection amount to be ejected through the additional ejection openings than that set for the ejection openings to perform printing."

*Kimura* discloses a liquid ejecting head and device including a liquid flow path having bubble generation heat elements used to generate bubbles having different sizes, and a movable mechanism having at least one movable member arranged to face a bubble generation region formed in the liquid flow path. In column 5, lines 35-

57 *Kimura* describes that a smoothing operation uses a liquid ejecting head capable of ejecting droplets having different sizes. A liquid flow path supplies an ejection outlet for ejecting the liquid. The liquid flow path has a bubble generating heat means used to eject the liquid, the heat means being capable of selectively generating bubbles having different sizes. At least one movable member faces the bubble generation region formed in the liquid flow path. The movable member guides the bubbles to the ejection outlet so as to supply the droplets having different sizes corresponding to the sizes of the bubbles to a boundary region between an image portion and a non-image portion, thereby performing a smoothing operation. In column 16, lines 5-7 *Kimura* describes a drive condition having 24V voltage, 5 $\mu$ s pulse width and a driving frequency of 200Hz.

One aspect of the claimed subject matter is related to the speed of the ejected droplets. Page sixteen of the present application describes an embodiment broadly encompassed by some of the claimed subject matter at issue. That is, in reference to Figs. 8-10, while the voltage varies and the size of the ink droplets changes, the speed at which the ink droplets are ejected remains relatively constant. Fig. 9 shows a graph of the speed of ejection of the ink droplets in response to the different pulse voltages shown in Fig. 8. Fig. 10 is a graph showing the volume of the ink droplets ejected in response to the application of the different pulse voltages shown in Fig. 8. As shown in Fig. 9, as the pulse voltages increase, the sizes of the ejected ink droplets increase while the ejection speed remains relatively constant at 5m/s.

Claim 39 is amended to better define that the smoothing dots and the image forming dots are ejected at the same speed. Claim 39 now defines an ink jet printer ejecting a plurality of kinds of ink droplets of different sizes from a single nozzle

depending upon data to be printed, thereby forming an image on a prescribed recording medium using dots of sizes corresponding to the sizes of the ink droplets. An ink jet head is for ejecting an image forming droplet and a smoothing droplet from a single nozzle based on data to be printed, the smoothing droplet being smaller than the image forming droplet, thereby printing dots of sizes corresponding to the sizes of the ink droplets on a prescribed recording medium. A smoother is for performing a smoothing process using the smoothing droplet to form a smoothing dot, wherein the distance between a center of the smaller size smoothing dot and a center of the image forming dot is smaller than the pitch of the image forming dot. A controller is for controlling the smoother, thereby maintaining constant the speed of ejection of the ink droplet forming the smoothing dot and changing the timing of ejection of the ink droplet forming the smoothing dot, by ejecting the smoothing dot at the same speed as that of the image forming dot.

#### Rejections under § 102(b)

Claim 39 is rejected as being anticipated by *Kimura*.

Claim 39 is allowable at least because *Kimura* does not disclose the subject matter related to maintenance of a constant speed of ejection of the ink droplet forming the smoothing dot and changing the timing of the ejection of the ink droplet forming the smoothing dot, by ejecting the smoothing dot at the same speed as that of the image forming dot. Rather, *Kimura* discloses a situation where a constant 24V is applied to cause a bubble that ejects different size ink droplets during printing (column 16, line 6). It is therefore understood that as the volume of ejected ink droplets increase, the speed of ejection will decrease, and vice versa. Thus, based

on the disclosure in *Kimura*, the opposite of the claimed subject matter is disclosed, i.e., that the speed of ejection is varied. For at least that reason, Claim 39 is not anticipated by *Kimura*.

Rejections under § 103(a)

Claims 3, 8, 26, 34 and 39 are rejected as being unpatentable over *Koitabashi* in view of *Kimura*.

Claims 39 is allowable at least because it defines a combination of features including an ink jet head for ejecting an image forming droplet and a smoothing droplet from a single nozzle based on data to be printed.

The Official Action recognizes that *Koitabashi* does not disclose the claimed subject matter relating to ejection of different size ink droplets from a single nozzle. That is, the Official Action recognizes that *Koitabashi* discloses ejecting image forming droplets with one nozzle, and smoothing droplets with another nozzle. The Official Action proposes that it would have been obvious to replace *Koitabashi's* ejection of image forming dots and smoothing dots with different nozzles with a single nozzle that ejects both types of dots with the same nozzle, because it is disclosed in *Kimura* in column 20, lines 44-47 that ejection of several different amounts of liquid can result in high precision in terms of ejection amounts and desired positions.

It would not have been obvious to modify *Koitabashi* in view of *Kimura* as suggested in the Official Action. That is, *Koitabashi* clearly teaches away from ejecting smoothing dots and image forming dots from the same nozzle by showing that it is desirable to eject smoothing dots and image forming dots from different

nozzles. As mentioned earlier, at column 25, lines 51-55 (emphasis added), *Koitabashi* specifically states that, “upon performing smoothing, it is desirable to make the dots to be formed in the smoothing mode by reducing the ejection amount to be ejected through the additional ejection openings than that set for the ejection openings to perform printing.” Also, in column 25, lines 53-55 (emphasis added), *Koitabashi* discloses “reducing the ejection amount to be ejected through the additional ejection openings than that set for the ejection openings to perform printing.” Also, in column 25, lines 47-50 (emphasis added) *Koitabashi* discloses performing “smoothing by employing the ejection openings other than the ejection openings used for printing in 360 DPI or 240 DPI, with respect to the dot data of 360 DPI or 240 DPI.”

Therefore, *Koitabashi* teaches away from ejecting smaller smoothing droplets and image forming droplets from the same nozzle. One skilled in the art would not have been directed to modify *Koitabashi* to include a feature from *Kimura* that was contemplated and dismissed as being undesirable.

It would also not be obvious to make that modification because doing such would change the intended operation of *Koitabashi*'s device. That is, *Koitabashi* intends for the device to operate so that smoothing dots and image forming dots are ejected from different nozzles. The Examiner is reminded that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” MPEP 2143.02. Here, by modifying *Koitabashi* to instead eject the smoothing and image forming dots from a single nozzle, the intended operation of *Koitabashi*'s device would be changed.

Claim 39 is also allowable at least because it defines a controller for controlling the smoother, thereby maintaining constant the speed of ejection of the ink droplet forming the smoothing dot and changing the timing of ejection of the ink droplet forming the smoothing dot, by ejecting the smoothing dot at the same speed as that of the image forming dot. The Official Action recognizes that this subject matter is not disclosed by *Koitaabashi* and relies on *Kimura* for a disclosure of such. However, as noted above with regard to the rejections under § 102(b), *Kimura* does not disclose deferent size ejections being at the same ejection speed. In fact, the opposite seems to be disclosed because the ejection voltage (25V) is constant, while the ejection amount varies. That is, the larger the ejection amount the slower the ejection speed.

For at least those reasons, Claim 39 is not obvious based on *Koitaabashi* in view of *Kimura*. Claims 3, 8, 36 and 34 are allowable at least by virtue of their dependence from allowable independent Claim 39.

### Conclusion

For the reasons stated above, it is requested that all the rejections be withdrawn and that this application be allowed in a timely manner.


In the event that there are any questions concerning this response, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

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(Including attorneys from Burns Doane Swecker & Mathis)

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